REMARKS

Reconsideration and allowance of the above-referenced application are respectfully requested.

I. STATUS OF THE CLAIMS

Various of the claims are amended herein.

Claims 1, 3-9, 11-20 and 22-31 are currently pending.

II. REJECTION OF ALL CLAIMS UNDER 35 USC 112, FIRST PARAGRAPH

Generally, the rejections appear to be based on the meaning of the term "combined" in "combined particle" as recited in the claims.

Therefore, the claims are amended to eliminate the term "combined." For example, the amended claim 1 now simply recites "a particle formed of adsorbate particles and substrate particles." Particles formed are adsorbate particles and substrate particles are well-known. Therefore, it is respectfully submitted that the claims are clear, and are fully supported by the specification.

The Examiner requests a copy of a software package implementing the present invention, so that the Examiner can determine what is meant by "combined." In view of the above-described claim amendments, a copy of such a software package should no longer be required.

In view of the above, it is respectfully submitted that the rejections under 35 USC 112 are overcome.

III. REJECTION OF CLAIM 23 UNDER 35 USC 112, SECOND PARAGRAPH

The preamble of claim 23 is amended to more clearly recite a "method."

In view of the above, it is respectfully submitted that the rejection is overcome.

IV. REJECTION OF ALL CLAIMS UNDER 35 USC 103 AS BEING UNPATENTABLE OVER MISAKA OR BAUMANN IN VIEW OF THE EXAMINER=S OWN EXPERIENCE AND THE TAKING OF OFFICIAL NOTICE

Baumann discloses that incoming spheres nearby the surface are generated by a Monte Carlo method. Baumann does not disclose individual particles which each have a corresponding emission source as recited, for example, in claim 1. Thus, Baumann does not

disclose that, for each individual particle, a kinetic condition setting unit sets a region indicating a position of the corresponding emission source, as recited, for example, in claim 1.

The Examiner specifically relies on the disclosure on page 4.4.2 of Baumann, relating to molecular dynamic simulation. However, it is respectfully submitted that this portion of Baumann does not inherently indicate the existence of an emission source for each particle.

FIG. 1 of Misaka discloses a particle transport model 15 for use in a simulator. The particle transport model 15 of Misaka is somewhat similar to an emission source of various embodiments of the present invention. However, Misaka does not disclose how to use such a source in a manner as in the present invention. For example, Misaka does not disclose or suggest the size of the source or the distance between the source and a substrate. Therefore, it is unclear how the particle transport model of Misaka would be used as, for example, an emission source such as recited in claim 1. Thus, Misaka does not disclose that, for each individual particle, a kinetic condition setting unit sets a region indicating a position of the corresponding emission source, as recited, for example, in claim 1.

In summary, neither Baumann nor Misaka, taken individually or in combination, discloses a particle formed of both adsorbate particles and substrate particles, where each adsorbate particle has a corresponding emission source, and that the adsorbate particles are generated in accordance with the positions of the emission sources, as recited in various of the claims.

In view of the above, it is respectfully submitted that the rejection is overcome.

V. REJECTION OF CLAIMS 1, 3-9, 11-20, 22-26 AND 28-31 UNDER 35 USC 103 AS BEING UNPATENTABLE OVER (YAMADA OR MISAKA OR BAUMANN OR HUSINSKY) IN VIEW OF (KINEMA/SIM OR REEVES OR COHEN)

The above comments for distinguishing over Misaka and Bauman also apply here.

Reeves relates to modeling "fuzzy" objects such as clouds, smoke, water and fire. Reeves does not disclose the use of adsorbate particles or substrate particles. Thus, Reeves cannot achieve, and does not address, various objects of various embodiments of the present invention, such those directed to crystal growth, surface adsorption, and surface damage.

The "generation shape" of Reeves is somewhat similar to an emission source of various embodiments of the present invention. However, generally, the present invention relates to the generation of atoms or molecules, and not the "fuzzy" objects of Reeves. Therefore, for example, the manner of setting initial velocity of generated particles in various embodiments of the present invention is significantly different than anything in Reeves.

The Examiner specifically relies on the disclosure in Section 2.1 of Reeves, relating to particle disclosure, and Section 2.2 of Reeves, relating to particles having an initial position and velocity. However, the examples in Reeves relate to, for example, "a wall of fire and explosion" and "fireworks." Reeves does not relate to molecular dynamics.

The Examiner also relies on pages 165-166 of Cohen. As should be understood from the examples in Cohen of "3. People Flow Simulation" and "4. Airbag Deployment Simulation," Cohen does not relate to molecular dynamics.

In summary, neither Reeves nor Cohen, taken individually or in combination, discloses a particle formed of both adsorbate particles and substrate particles, where each adsorbate particle has a corresponding emission source, and that the adsorbate particles are generated in accordance with the positions of the emission sources, as recited in various of the claims as amended herein.

In view of the above, it is respectfully submitted that the rejection is overcome.

VI. REJECTION OF ALL CLAIMS UNDER 35 USC 103 AS BEING UNPATENTABLE OVER OHIRA IN VIEW OF KINEMA/SIM OR REEVES OR COHEN

The above comments for distinguishing over Reeves and Cohen also apply here.

Kinema/Sim does not relate to a particle formed of both adsorbate particles and substrate particles, where each adsorbate particle has a corresponding emission source, and that the adsorbate particles are generated in accordance with the positions of the emission sources, as recited in various of the claims.

As an example, Kinema/Sim cannot control the temperature of the substrate particles and it cannot stop movement of the substrate particle. Therefore, as an example, Kinema/Sim cannot simulate crystal growth, surface adsorption, and surface damage. As Kinema/Sim is not directed to, and cannot achieve, various objects of the present invention, Kinema/Sim should not be combined with the other references to reject the claimed invention.

Ohira does not disclose an adsorbate emission source. Therefore, for example, Ohira does not disclose how to set generation schedules and initial velocities for plural number of adsorbate particles. Thus, Ohira cannot achieve various objects of the present invention, and should not be combined with the other references to reject the claimed invention.

In view of the above, it is respectfully submitted that the rejection is overcome.

VII. CONCLUSION

In view of the above, it is respectfully submitted that the application is in condition for allowance, and a Notice of Allowance is earnestly solicited.

If any further fees are due by the filing of this Amendment, please charge same to deposit account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: February 21, 2002

By: Paul I. Kravetz

Paul I. Kravetz
Registration No. 35,230

700 Eleventh Street, NW, Suite 500
Washington, D.C. 20001
(202) 434-1500

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please AMEND the claims as follows:

For the convenience of the Examiner, all the pending claims are set forth below, whether or not the claims are amended herein.

1. (FOUR TIMES AMENDED) An apparatus for simulating phenomena of a [combined] particle formed of adsorbate particles and substrate particles, comprising:

a kinetic condition setting unit which sets information for defining a plurality of generation periods and a corresponding number of adsorbate particles to be generated during each generation period; and

a particle motion computing unit which generates the adsorbate particles in accordance with the information set by the kinetic condition setting unit and computes motion of the generated adsorbate particles, to simulate phenomena of [the combined] said particle formed of adsorbate particles and substrate particles, each adsorbate particle having a corresponding emission source wherein

for each adsorbate particle, the kinetic condition setting unit sets a region indicating a position of the corresponding emission source, and

the particle motion computing unit generates each adsorbate particle in accordance with the position of the corresponding emission source.

3. (ONCE AMENDED) An apparatus as in claim 1, wherein

before generating the adsorbate particles, the particle motion computing unit generates the substrate particles.

4. (NOT AMENDED) An apparatus as in claim 1, further comprising:

a display which allows a user to enter the information set by the kinetic condition setting unit.

5. (ONCE AMENDED) An apparatus as in claim 1, wherein

the kinetic condition setting unit sets information for generating the substrate particles.

6. (TWICE AMENDED) An apparatus as in claim 1, wherein

each adsorbate particle is formed of atoms;

the information set by the kinetic condition setting unit includes information indicating whether the atoms of a respective adsorbate particle are static against a center of mass of the adsorbate particle; and

when the particle motion computing unit generates an adsorbate particle and the information set by the kinetic condition setting unit indicates that the atoms of the respective adsorbate particle are not static against the center of mass, the particle motion computing unit provides a random orientation to the atoms of the adsorbate particle.

7. (NOT AMENDED) An apparatus as in claim 6, further comprising:

a display which allows a user to enter the information set by the kinetic condition setting unit.

8. (TWICE AMENDED) An apparatus as in claim 1, wherein

each adsorbate particle is formed of atoms;

the information set by the kinetic condition setting unit includes information indicating whether the atoms of a respective adsorbate particle are static against a center of mass of the adsorbate particle; and

when the particle motion computing unit generates an adsorbate particle and the information set by the kinetic condition setting unit indicates that the atoms of the respective adsorbate particle are not static against the center of mass, the particle motion computing unit provides an initial velocity to the atoms of the adsorbate particle.

9. (TWICE AMENDED) An apparatus as in claim 1, wherein, when generating an adsorbate particle, the particle motion computing unit provides a random direction within a cone pointed at a substrate and being centered at a point of generation of center of mass velocity of the adsorbate particle.

11. (NOT AMENDED) An apparatus as in claim 1, further comprising:

a display which displays the information set by the kinetic condition setting unit.

12. (TWICE AMENDED) An apparatus for simulating phenomena of a [combined] particle formed of adsorbate particles and substrate particles, each adsorbate particle having a corresponding emission source, the apparatus comprising:

an input device which allows a user to designate a region;

a kinetic condition setting unit which, for each adsorbate particle, sets the region designed by the user as a region indicating a position of the corresponding emission source; and

a particle motion computing unit which generates the adsorbate particles in accordance with the position of the corresponding emission source as indicated by the region designated by the user and computes motion of the generated adsorbate particles, to simulate phenomena of [the combined] <u>said</u> particle <u>formed of adsorbate particles and substrate particles</u>.

13. (NOT AMENDED) An apparatus as in claim 12, wherein the input device is a display.

14. (NOT AMENDED) An apparatus as in claim 12, further comprising:

a display which displays the information set by the kinetic condition setting unit.

15. (ONCE AMENDED) An apparatus as in claim 14, wherein the display shows the adsorbate particles generated by the particle motion computing unit and indicates the motion computed by the particle motion computing unit.

16. (FOUR TIMES AMENDED) An apparatus for simulating phenomena of a [combined] particle formed of adsorbate particles and substrate particles, each adsorbate particle having a corresponding emission source, the apparatus comprising:

a kinetic condition setting unit which sets information for defining kinetic conditions of the adsorbate particles; and

a particle motion computing unit which generates the adsorbate particles in accordance with the information set by the kinetic condition setting unit and the position of the corresponding emission source, and computes motion of the generated adsorbate particles, to simulate phenomena of [the combined] <u>said</u> particle <u>formed of adsorbate particles and substrate particles</u>, each adsorbate particle having a corresponding emission source.

17. (TWICE AMENDED) An apparatus as in claim 16, wherein

the adsorbate particles move towards the substrate particles,

the kinetic condition setting unit sets a region for defining an initial position of the adsorbate particles, and

the apparatus further comprises a display which displays the relationship between the region set by the kinetic condition setting unit and a region indicating a position of a substrate particle forming [the combined] <u>said</u> particle <u>formed of adsorbate particles and substrate particles</u>.

18. (ONCE AMENDED) An apparatus as in claim 17, wherein

the kinetic condition setting unit sets information for providing a direction of velocity to the adsorbate particles, and

the display shows the direction of velocity with respect to the region set by the kinetic condition setting unit and the region indicating the position of a respective substrate particle.

19. (NOT AMENDED) An apparatus as in claim 16, further comprising:

a display which displays the information set by the kinetic condition setting unit.

20. (FOUR TIMES AMENDED) A computer-implemented method for simulating phenomena of a [combined] particle formed of adsorbate particles and substrate particles, each adsorbate particle having a corresponding emission source, the method comprising the steps of:

setting information for defining a plurality of generation periods and a corresponding number of adsorbate particles to be generated during each generation period;

generating the adsorbate particles in accordance with the information set in the setting step and the position of the corresponding emission sources;

computing motion of the generated adsorbate particles; and

simulating phenomena of [the combined] <u>said</u> particle <u>formed of adsorbate particles and substrate particles</u> in accordance with the computed motion.

22. (FOUR TIMES AMENDED) A computer-implemented method for simulating phenomena of a [combined] particle formed of adsorbate particles and substrate particles, each adsorbate particle having a corresponding emission source, the method comprising the steps

of:

setting, for each adsorbate particle, a region indicating a position of the corresponding emission source;

generating the adsorbate particles in accordance with the position of the corresponding emission source as indicated by the region set in the setting step;

computing motion of the generated adsorbate particles; and

simulating phenomena of [the combined] <u>said</u> particle <u>formed of adsorbate particles and substrate particles</u> in accordance with the computed motion.

23. (FOUR TIMES AMENDED) <u>A method</u> [An apparatus] for simulating phenomena of a [combined] particle formed of adsorbate particles and substrate particles, each adsorbate particle having a corresponding emission source, the [apparatus] <u>method</u> comprising:

setting information for defining kinetic conditions of the adsorbate particles;

displaying the set information;

generating the adsorbate particles in accordance with the set information and the positions of the corresponding emission sources; and

computing motion of the generated adsorbate particles, to simulate phenomena of [the combined] <u>said</u> particle <u>formed of adsorbate particles and substrate particles</u>, each adsorbate particle having a corresponding emission source.

24. (FOUR TIMES AMENDED) An apparatus for simulating phenomena of a [combined] particle formed with adsorbate particles, comprising:

a kinetic condition setting unit which sets information for defining kinetic conditions of the adsorbate particles; and

a particle motion computing unit which generates the adsorbate particles in accordance with the information set by the kinetic condition setting unit and computes motion of the generated adsorbate particles, to simulate phenomena of [the combined] <u>said</u> particle <u>formed with adsorbate particles</u>, each adsorbate particle having a corresponding emission source, wherein

for each adsorbate particle, the kinetic condition setting unit sets a region indicating a position of the corresponding emission source, and

the particle motion computing unit generates each adsorbate particle in accordance with the position of the corresponding emission source as indicated by the region

set by the kinetic condition setting unit.

25. (NOT AMENDED) An apparatus as in claim 24, wherein the information set by the kinetic condition setting unit defines a plurality of generation periods and a corresponding number of adsorbate particles to be generated during each generation period by the particle motion computing unit.

26. (TWICE AMENDED) An apparatus as in claim 24, wherein

said [the combined] particle formed with adsorbate particles is formed with both adsorbate particles and substrate particles,

the information set by the kinetic condition setting unit includes information for defining kinetic conditions of the substrate particles, and

the particle motion computing unit generates the substrate particles before generating the adsorbate particles.

27. (TWICE AMENDED) An apparatus as in claim 24, wherein

said [the combined] particle formed with adsorbate particles is formed with both adsorbate particles and substrate particles,

each substrate particle includes a fixed particle and a temperature control particle,

the information set by the kinetic condition setting unit includes information for defining kinetic conditions of the fixed particle and the temperature control particle, and

the particle motion computing unit generates the fixed particle and the temperature control particle of each substrate particle in accordance with the information set by the kinetic condition setting unit.

28. (NOT AMENDED) An apparatus as in claim 24, further comprising:

a display which displays the information set by the kinetic condition setting unit.

29. (TWICE AMENDED) An apparatus as in claim 24, wherein

each adsorbate particle includes a plurality of atoms;

the information set by the kinetic condition setting unit includes information indicating whether the atoms of a respective adsorbate particle are static against a center of mass of the adsorbate particle; and

when the particle motion computing unit generates an adsorbate particle and the information set by the kinetic condition setting unit indicates that the atoms of the respective adsorbate particle are not static against the center of mass, the particle motion computing unit provides a random orientation to the atoms of the adsorbate particle.

30. (ONCE AMENDED) An apparatus as in claim 29, wherein, when the particle motion computing unit generates an adsorbate particle and the information set by the kinetic condition setting unit indicates that the atoms of the respective adsorbate particle are not fixed against center of mass, the particle motion computing unit provides an initial velocity to the atoms of the adsorbate particle.

31. (TWICE AMENDED) An apparatus as in claim 24, wherein, when generating an adsorbate particle, the particle motion computing unit provides a random direction within a cone pointed at a substrate and being centered at a point of generation of center of mass velocity of the adsorbate particle.